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PAUL, HASTINGS, JANOFSKY & WALKER LLP
P.O. BOX 919092
SAN DIEGO, CA 92191-9092

EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/628,290	VALLEE ET AL.	
	Examiner	Art Unit	
	Thomas H. Parsons	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-20 and 25-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-20 and 25-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This is in response to the Amendment filed 30 April 2007.

(Previous) DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group III (claims 15 -20), a process for making a battery, in the reply filed on 30 November 2006 is acknowledged. The traversal is on the ground(s) that "the subject matter of all of claims 1-24 is sufficiently related that a thorough and complete search for the subject matter of the elected claims would necessarily encompass a thorough and complete search for the subject matter of the non-elected claims". This is not found persuasive because the process is not the only way to prepare a battery and by examining all claims would be burdensome. The requirement is still deemed proper and is therefore made **FINAL**.

Claim Rejections - 35 USC § 112

2. The rejections of claims 17 and 19 as lacking sufficient antecedent basis for the limitation "second side" in step a, line 1 have been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 102

3. The rejections of claims 15-16 under 35 U.S.C. 102(b) as being anticipated by Velasquez et al. (U.S. Patent Number 5,670,273) have been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 103

4. The rejections of claims 18 -19 under 35 U.S.C. 103(a) as being unpatentable over Velasquez et al. (U.S. Patent Number 5,670,273) have been **withdrawn** in view of Applicants' Amendment.

5. The rejection of claim 17 under 35 U.S.C. 103(a) as being unpatentable over Velasquez et al. (U.S. Patent Number 5,670,273) in view of Schutts et al. (U.S. Patent Number 6,136,476) has been **withdrawn** in view of Applicants' Amendment.

6. The rejection of Claim 20 under 35 U.S.C. 103(a) as being unpatentable over Velasquez et al. (U.S. Patent Number 5,670,273) in view of Schutts et al. (U.S. Patent Number 6,136,476) has been **withdrawn** in view of Applicants' Amendment.

Response to Arguments

7. Applicant's arguments with respect to claims 15-20 have been considered but are moot in view of the new ground(s) of rejection.

(New) DETAILED ACTION

Claim Objections

8. Claim 36 is objected to because of the following informalities:

Line 1, suggest changing "comprisew" to --comprises--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 15-16, 32-37, 18-19, 25-27, 29-31, 38-40, and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velasquez et al. (5,670,273) in view of Gustafson et al. (5,888,672).

Claim 15: Velasquez et al. in Figure 1 disclose a process for preparing a battery, the process comprising the steps of:

a. preparing a metallic lithium or lithium alloy sheet (10)(col. 7: 18-25);

b. preparing a cathode slurry comprising a active material; an electronic conductive filler; a lithium salt and an ionically conductive electrolyte binder (col. 8: 14-33 and col. 5: 54-65);

c. preparing an electrolyte solution comprising a lithium salt, and from about 10% by weight to about 60% by weight of solvent (col. 8: 34-45);

d. applying the cathode slurry onto a first side of a current collector (32) to form a cathode film (30);

e. applying the electrolyte solution onto the cathode film to form an electrolyte separator (21);

f. applying the metallic lithium or lithium alloy sheet onto the electrolyte separator to form an electrochemical cell. See also col. 2: 7-21.

Velasquez et al. do not disclose an electrolytic solution comprising a soluble polyimide.

Gustafson et al. disclose an electrolytic solution comprising a soluble polyimide (Figure 2, and col. 8: 14-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the electrolytic solution of Velasquez et al. by incorporating the soluble polyimide of Gustafson et al. because Gustafson et al. teach an electrolytic solution for a battery comprising a soluble polyimide that would have provided a battery that exhibits high ionic conductivity with insubstantial change over a range of temperatures and pressures (col. 3: 9-23).

Claim 16: Velasquez et al. disclose a step of crosslinking of the polyimide electrolyte by exposing the polyimide electrolyte to thermal energy, UV radiation or electron beam (col. 5: 11-25).

Claim 32: Velasquez et al. disclose on col. 5: 11-42, "Suitable polymerization conditions are well known in the art..." Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the crosslinking step of Velasquez et al. by:

a. adding a crosslinkable monomer to the electrolyte solution; and

b. adding a cross-linking initiator.

Claim 33: Velasquez et al. disclose that the solvent is selected from the group consisting of gamma-butyrolactone (col. 6: 5-23).

Velasquez et al. further disclose that the solvent is any compatible, relatively non-volatile, aprotic, relatively polar, solvent. Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have selected such a solvent

including N,N-methylpyrolidinone (NMP), and sulfamides of formula; $R_1R_2N\text{-}SO_2\text{-}NR_3R_4$, in which R_1, R_2, R_3 and R_4 are alkyls having between 1 and 6 carbon atoms and/or oxyalkyls having between 1 and 6 carbon atoms or combinations thereof. See col. 6: 5-23.

Claim 34:Velasquez et al. disclose that the lithium salt is selected from the group consisting of LiBr, LiI, $Li(ClO_4,)$, $Li(BF_4)$, $Li(PF_6)$, $Li(AsF_6)$, $Li(CF_3\ SO_3)$, and $Li(CF_3SO_2)_2N$.

Velasquez et al. further disclose that the salt can be any salt, for example, an inorganic salt, which is suitable for use in a non-aqueous electrolyte. Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have selected a suitable salt, including lithium tetrafluorosulfonimide, lithium salts derived from bisperhalogenoacyl and bissulfonylimide, LiCl, $Li(CH_3CO_2)$, and, $Li(CF_3SO_2)_3$, $Li(CF_3CO_2)$, $Li(B(C_6H_5)_4)$, Li(SCN), and $Li(NO_3)$. See col. 5: 54-65.

Claim 35: Velasquez et al. disclose that the active material is selected from the group consisting of: $LiCoO_2$; $LiMn_2O_4$; $LiNiO_2$; and, V_2O_5. See col. 7: 38-60.

Velasquez et al. on col. 7: 38-60 disclose "The cathode typically comprises a compatible cathodic material...which is any material which functions as a positive pole in a solid electrolyte cell. Such compatible cathodic materials are will known in the art..." Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to select any compatible material including $LiMnO_2$; LiV_3O_8; $Li_4Ti_5O_{12}$ and $LiFePO_4$.

Claim 36: Velasquez et al. disclose that the electrolyte solution comprises from about 15% by weight to about 50% by weight of solvent (col. 8: 41-45).

Claim 37: Velasquez et al. disclose that the electrolyte solution comprises from about 20% by weight to about 40% by weight of solvent (col. 8: 41-45).

Claim 18: Velasquez et al. in Figure 1 disclose a process for preparing a battery, the process comprising the steps of:

a. preparing a metallic lithium or lithium alloy sheet (col. 6: 5-23);

b. preparing a cathode slurry comprising an active material; an electronic conductive filler; a lithium salt and an ionically conductive electrolyte binder (col. 8: 14-33 and col. 5: 54-65);

c. preparing an electrolyte solution comprising a lithium salt, and from about 70% by weight to about 95% by weight of solvent (col. 8: 34-45);

d. applying the cathode slurry onto a first side of a current collector (32) to form a cathode film (30);

e. applying the electrolyte solution onto the cathode film;

f. drying the electrolyte solution to evaporate the solvent to form an electrolyte separator;

g. assembling the metallic lithium or lithium alloy sheet onto the electrolyte separator to form a battery. See also col. 2: 7-21.

Velasquez does not include the amount of solvent by weight that remains (i.e. *comprising from about 10% by weight to about 60% by weight of solvent*) in the electrolyte after a portion has been evaporated out (i.e. *from 10% by weight to 80% by weight*). However, by curing the electrolyte to cross-link the polymer, it is obvious that some amount of the solvent evaporates out leaving a smaller percentage of solvent left in the electrolyte.

It would have been obvious to one of ordinary skill in the art at the time of the invention that by curing an electrolyte part of the solvent will have evaporated leaving a smaller portion of solvent in the electrolyte. By optimizing the amount of energy needed to cure the electrolyte,

making the process efficient, would result in the necessary amount of solvent being evaporated. Therefore, one of ordinary skill would choose to optimize the process and evaporate out the amount needed to cure the electrolyte.

Velasquez et al. do not disclose an electrolytic solution comprising a soluble polyimide.

Gustafson et al. disclose an electrolytic solution comprising a soluble polyimide (Figure 2, and col. 8: 14-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the electrolytic solution of Velasquez et al. by incorporating the soluble polyimide of Gustafson et al. because Gustafson et al. teach an electrolytic solution for a battery comprising a soluble polyimide that would have provided a battery that exhibits high ionic conductivity with insubstantial change over a range of temperatures and pressures (col. 3: 9-23).

Claim 19: The rejection of claim 19 is as set forth above in claim 16.

Claim 25: Velasquez et al. in Figure 1 disclose a process for manufacturing a battery, the process comprising the steps of:

a. preparing an electrolyte solution comprising a lithium salt, and from about 10% by weight to about 60% by weight of solvent (col. 8: 34-45);

b. applying a cathode slurry comprising an active material, an electronic conductive filler, a lithium salt and an ionically conductive electrolyte binder onto a first side of a current collector (32) to form a cathode film (30)(col. 8: 14-33 and col. 5: 54-65);

c. applying the electrolyte solution onto the cathodic film to form an electrolyte separator;

d. cross-linking the electrolyte solution by exposing the polyimide electrolyte to UV radiation (col. 5: 11-25); and

e. applying a metallic lithium or lithium alloy sheet onto the electrolyte separator to form an electrochemical cell. See also col. 2: 7-21.

Velasquez et al. do not disclose an electrolytic solution comprising a soluble polyimide.

Gustafson et al. disclose an electrolytic solution comprising a soluble polyimide (Figure 2, and col. 8: 14-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the electrolytic solution of Velasquez et al. by incorporating the soluble polyimide of Gustafson et al. because Gustafson et al. teach an electrolytic solution for a battery comprising a soluble polyimide that would have provided a battery that exhibits high ionic conductivity with insubstantial change over a range of temperatures and pressures (col. 3: 9-23).

Claims 26 and 27: Velasquez et al. on col. 5: 12-42 disclose that suitable polymerization conditions are well known in the art. Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to select suitable conditions including adding a crosslinkable monomer to the electrolyte solution and a cross-linking initiator. See also claim 32 above.

Claim 29: The rejection of claim 29 is as set forth above in claim 33.

Claim 30: The rejection of claim 30 is as set forth above in claim 34.

Claim 31: The rejection of claim 31 is as set forth above in claim 35.

Claim 38: The rejection of claim 38 is as set forth above in claim 25 except for step d. wherein Velasquez et al. disclose cross-linking the electrolyte solution by exposing the polyimide electrolyte to UV heat (col. 5: 11-25).

Claims 39 and 40: The rejections of claims 39 and 40 are as set forth above in claims 26 and 27.

Claim 42: The rejection of claim 42 is as set forth above in claim 29.

Claim 43: The rejection of claim 43 is as set forth above in claim 30.

Claim 44: The rejection of claim 43 is as set forth above in claim 31.

11. Claims 17, 20, 28 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velasquez et al. in view of Gustafson et al. as applied to claim 15 above, and further in view of Schutts et al. (6,136,476).

Velasquez et al. and Gustafson et al. are as applied, argued, and disclosed above, and incorporated herein.

Claims 17, 20, 28, and 41: Velasquez et al. on col. 11: 7-8 disclose, "In fabricating a battery, a plurality of electrochemical precursors can be stacked one on top of each other ...". Such stacking would obviously comprising the steps of:

a. applying the cathode slurry onto a second side of the current collector to form a second cathode film;

b. applying the electrolyte solution onto the second cathode film to form a second electrolyte separator; thereby forming a bi-face electrochemical cell.

Velasquez et al. do not disclose

c. stacking a plurality of bi-face electrochemical cell to form a battery.

Schutts et al. teach creating a bi- face cell in which an electrolyte is disposed between an anode film and a cathode film, with a central cathode current collector between each cathode film (column 8, lines 4-63 and Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the battery of the Velasquez et al. combination to form a bi-face cell. Schutts et al. teach that a mono-face cell configuration may alternatively be employed (column 8, lines 62-63), demonstrating that it would be easy to add a cathode film to a second side of a current collector to create a bi-face cell. This bi-face cell allows for stacking several cells together to create a battery thereby increasing the overall capacity of the battery.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Thomas H Parsons
Examiner
Art Unit 1745

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